

WHAT IS CLAIMED IS:

1. A structure of multi-tier wire bonding for high frequency integrated circuit, comprising:

a first electronic device, comprising:

- 5 a wire-bonding surface;
- a first carrier surface, arranged on the opposite side of the wire-bonding surface,
- at least a signal bonding pad, located at the border of the wire-bonding surface; and
- 10 at least a coplanar bonding pad, located at the wire-bonding surface and surrounding the signal bonding pad;

and

a second electronic device, comprising:

- 15 a second carrier surface, abutted to the first carrier surface, having a border portion of the second carrier surface not covered by the first carrier surface and surrounding the first carrier surface;
- a plurality of leads, being arranged at the border portion of the second carrier surface and being positioned in
- 20 correspondence to the signal bonding pad and the coplanar bonding pad; and
- a plurality of metal wires, including at least a signal wire and a plurality of ground wires,

25 wherein the signal wire is electrically connected between the signal bonding pad and the lead corresponding to the signal bonding pad, the ground wires are electrically connected between the coplanar bonding pads and a linear bonding pad which is the border portion of the second carrier surface surrounding the first carrier surface.

30 2. The bonding wire structure according to claim 1, wherein the signal wire and the ground wires are interlaced arranged.

3. The bonding wire structure according to claim 1, wherein the coplanar

bonding pad is a U-shaped structure, the concave side of the U-shaped structure surrounds the signal bonding pad and the convex side is facing to the signal bonding pad.

5 4. The bonding wire structure according to claim 3, wherein two ground wires are arranged symmetrically at the convex side of said coplanar bonding pad.

5. The bonding wire structure according to claim 4, wherein two ground wires are electrically connected to the second carrier surface.

10 6. The bonding wire structure according to claim 5, wherein two pairs of ground wires are arranged respectively and symmetrically at the two sides of said concave side of the U-shaped structure .

7. The bonding wire structure according to claim 6, wherein the two proximal ground wires are electrically connected to the second carrier surface.

15 8. The bonding wire structure according to claim 7, wherein the two distal ground wires are electrically connected to the leads.

9. The bonding wire structure according to claim 1, wherein the coplanar bonding pad is a U-shaped structure, and a concave side of the U-shaped structure is facing to the leads.

20 10. The bonding wire structure according to claim 9, wherein two grounded wires are arranged respectively at the two sides of said concave side of the U-shaped structure.

11. The bonding wire structure according to claim 10, wherein each of the two ground wires electrically connects to the second carrier surface.

25 12. The bonding wire structure according to claim 11, wherein four ground wires are located at the concave side of said U-shaped structure.

30 13. The bonding wire structure according to claim 12, wherein the two proximal ground wires located close to the center of concave side of the U-shaped structure are electrically connected to the second carrier surface.

14. The bonding wire structure according to claim 13, wherein said two

distal ground wires are electrically connected to the grounded leads.

15. The bonding wire structure according to claim 13, wherein said signal wire and said ground wires are interlaced arranged.

16. The bonding wire structure according to claim 10, wherein two ground wires are symmetrically located to the concave tip of the U-shaped structure.

17. The bonding wire structure according to claim 10 wherein said two ground wires electrically connect to the grounded leads.

18. A structure of multi-tier wire bonding for high frequency integrated circuit, comprising:

at least one high frequency signal bonding pad located at a chip side;

at least one ground coplanar bonding pad surrounding said high frequency signal bonding pad;

a plurality of leads located at a package side; and

at least a ground surface;

wherein said high frequency signal bonding pad is connected to a corresponding lead of the package side using normal bonding, and there are at least two ground loops comprise a first ground loop and a second ground loop, the first ground loop is closer to said high frequency signal bonding loop than the second ground loop.

19. The bonding wire structure of claim 18, wherein said first ground loop is started at the first row of said ground bonding pad and said second ground loop is started at the second row of said ground bonding pad, the first row is closer to the ground surface than the second row.

20. The bonding wire structure of claim 19, wherein the two ground wires of said first set ground loop are formed by reverse bonding method.

21. The bonding wire structure of claim 20, wherein the two ground wires of said second ground loop are formed by normal bonding method.

22. The bonding wire structure of claim 20, wherein the two ground wires

of said second ground loop are formed by reverse bonding method.

23. The bonding wire structure of claim 22, wherein said first ground loop and said second ground loop are interlaced arranged around the high frequency signal bonding.

24. The bonding wire structure of claim 23, further comprising a third ground loop having two ground wires, wherein the third ground loop is neighbor to the high frequency signal bonding, said second ground loop is closer to said high frequency signal bonding than the third ground loop.

25. The bonding wire structure of claim 24, wherein the third ground loop starts from the second row of said ground coplanar bonding pad.

26. The bonding wire structure of claim 25, wherein the two ground wires of said third ground loop are formed by normal bonding method.

27. The bonding wire structure of claim 26, wherein said ground coplanar bonding pad is a U-shaped structure and a convex side of said U-shaped structure facing said ground surface and the concave side of said U-shaped structure surrounds said high frequency signal bonding pad.

28. The bonding wire structure of claim 27, wherein the two ground wires of the first ground loop each has an end located at the ground coplanar bonding pad.

29. The bonding wire structure of claim 28, wherein the two ground wires of the second ground loop each has an end located oppositely at a side of the concave side of said ground coplanar bonding pad.

30. The bonding wire structure of claim 29, wherein the two ground wires of the third grounded loop each has an end located oppositely at a side of the concave side of said ground coplanar bonding pad.

31. The bonding wire structure of claim 26, wherein the concave side of said ground coplanar bonding pad is facing said ground surface.

32. The bonding wire structure of claim 31, wherein the two ground wires of the first ground loop are respectively arranged at the two opposite sides of the concave side of said ground coplanar bonding pad.

33. The bonding wire structure of claim 32, wherein the second and the

third ground loops are arranged at the convex side of said ground coplanar bonding pad.

34. The bonding wire structure of claim 21, wherein the concave side of said ground coplanar bonding pad is facing said ground surface.

5 35. A structure of multi-tier wire bonding for high frequency integrated circuit, comprising:

a plurality of bonding pads, located on a chip, including a high frequency signal bonding pad and a plurality of ground bonding pads surrounding the high frequency signal bonding pad;

10 a plurality of leads, located on a package body; and
at least a ground surface;

wherein a signal wire connected to said high frequency signal bonding pad is surrounded by a plurality of ground wires connecting said leads and said ground surface.

15 36. The bonding wire structure of claim 35, wherein a plurality of ground wires connecting said leads and said ground surface comprise of two ground wires.

20 37. The bonding wire structure of claim 35, wherein a plurality of ground wires connecting said leads and said ground surface comprise of four ground wires.